

WHAT IS CLAIMED IS:

1. A CMP pad which is abrasive-free and comprises:

cells and/or a recessed portion-forming material both having an average diameter ranging from 0.05 to 5 290 μm and occupying a region ranging from 0.1% by volume to 5% by volume based on an entire volume of said pad; and

an organic material.

10 2. The CMP pad according to claim 1, wherein said CMP pad has a compression elastic modulus ranging from 100 to 600 MPa.

15 3. The CMP pad according to claim 1, wherein said CMP pad has a compression elastic modulus ranging from 300 to 600 MPa.

4. The CMP pad according to claim 1, wherein said region ranges from 1% by volume to 4% by volume based on an entire volume of said pad.

20 5. The CMP pad according to claim 1, wherein said cells and/or a recessed portion-forming material respectively has an average diameter ranging from 1 to 100 μm .

25 6. The CMP pad according to claim 1, wherein said organic material comprises at least one selected from the group consisting of 1,2-polybutadiene resin, ethylene-vinyl acetate copolymer, polyethylene, polyester resin, diene elastomer, polyolefin elastomer,

styrene type block copolymer-based elastomer, thermoplastic polyurethane-based elastomer, conjugated diene-based rubber, ethylene- α -olefin-based rubber and urethane resin.

5 7. The CMP pad according to claim 1, wherein said recessed portion-forming material is a water soluble solid material.

10 8. The CMP pad according to claim 7, wherein said water soluble solid material is an organic water soluble solid material.

9. The CMP pad according to claim 8, wherein said organic water soluble solid material is formed of at least one selected from the group consisting of dextrin and cyclodextrin.

15 10. The CMP pad according to claim 7, wherein said water soluble solid material is an inorganic water soluble solid material.

11. A method of manufacturing a semiconductor device comprising:

20 forming a treating film above a semiconductor substrate; and

25 subjecting said treating film to polishing treatment using a polishing pad while feeding a slurry onto said treating film, said polishing pad comprising a matrix, and cells and/or a recessed portion-forming material both having an average diameter ranging from 0.05 to 290 μm , dispersed in said matrix, and occupying

a region ranging from 0.1% by volume to 5% by volume based on an entire volume of said pad, said matrix having a major surface which faces said treating film and has a roughness of 5 μm or less.

5 12. The method according to claim 11, wherein said treating film is a conductive film deposited on an insulating film having a recessed portion and deposited above said semiconductor substrate, said treating film being subsequently subjected to said polishing
10 treatment to form a wiring layer which is buried in said recessed portion.

13. The method according to claim 12, wherein said conductive film includes Cu film.

14. The method according to claim 12, wherein said insulating film is formed by a process wherein a first insulating film having a relative dielectric constant of less than 2.5 is formed at first, and then, a second insulating film having a higher relative dielectric constant than that of said first insulating film is
20 deposited on said first insulating film.

15. The method according to claim 14, wherein said first insulating film is formed of a material selected from the group consisting of polysiloxane, hydrogen silsesquioxane, polymethylsiloxane, methylsilsesquioxane, polyarylene ether, polybenzoxazole, polybenzocyclobutene and a porous silica film.
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16. The method according to claim 14, wherein said second insulating film is formed of a material selected from the group consisting of SiC, SiCH, SiCN, SiOC, SiN and SiOCH.

5 17. The method according to claim 11, further comprises forming a trench on said semiconductor substrate prior to the forming of said treating film above said semiconductor substrate; said treating film being an insulating film deposited above said semiconductor substrate and subsequently subjected to said polishing treatment to form a pattern of the insulating film which is buried in said trench.

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15 18. The method according to claim 17, wherein said insulating film is formed of a material selected from the group consisting of SiO₂ and organic SOG.

19. The method according to claim 11, wherein said slurry contains abrasive grains.

20 20. The method according to claim 11, wherein said recessed portion-forming material is formed of a water soluble solid material eluting from said matrix to form recessed portions on a surface of said polishing pad during said polishing treatment.